Pigment Concentration

Product Description

This Level 2 product contains several parameters describing ocean chlorophyll fluorescence properties. Fluorescence line height (Parameter 2575) is a relative measure of the amount of radiance leaving the sea surface at the fluorescence wavelength of 683 nm. Parameter 3211 is Fluorescence Efficiency which provides a relative measure of the absorption of PAR and its emission as chlorophyll fluorescence. The third is Fluorescence Line Curvature (Parameter 2573). The spatial resolution will be 1 km for chlorophyll levels greater than 1.5 mg/m^3 and 5×5 km for values less than 1.5. The Level 2 product is produced daily and Level 3 is gridded and produced daily and weekly.

Research & Applications

Solar stimulated chlorophyll fluorescence is a measure of the current photophysology of phytoplankton, in contrast to the biomass estimate provided by chlorophyll. The product quantifies the level of photosynthesis by phytoplankton in the ocean. Historically, the coupling between fluorescence and chlorophyll has been studied extensively and recent research has focused on the use of Sun-stimulated fluorescence to estimate primary productivity (Kiefer and Reynolds, 1992). Basic fluorometric measurements are made using an instrument described by Holm-Hansen *et al.* (1965) which uses blue light stimulation and this method has been used unchanged for 30 years. Gower (1990) was among the first to attempt using Sun-stimulated radiance at 683 nm to estimate chlorophyll concentrations from aircraft and satellites.

Data Set Evolution

Inputs to the algorithm are Chlorophyll Concentration (MOD 19), Absorbed Radiation by Phytoplankton (MOD 22), and Water-Leaving Radiance (MOD 18). Water-leaving radiance for MODIS bands 13 (667 nm), 14 (678 nm) and 15 (748 nm) are used in the algorithm. The algorithm is applied to the daily input standard product datasets and is remapped into standard Level 3 grids. The validation approach will be to compare the fluorescence line height result with other MODIS data products (e.g. Chlorophyll *a*, comparison with surface measurements and comparison of MODIS fluorescence products with other satellite-based estimates of the same products). The products are produced only for non-cloud, glint-free ocean pixels during daylight hours.

Suggested Reading

Abbott, M.R., *et al.*, 1982.

Chamberlin, W.S. and J. Marra, 1992.

Gower, F.J.R. and G.A. Borstad, 1990.

Holm-Hansen, O., *et al.*, 1965.

Kiefer, D.A. and R.A. Reynolds, 1992.

Topliss, B.J., and T. Platt, 1986.

MOD 20
PRODUCT SUMMARY

Coverage:
global ocean surface, clear-sky only

Spatial/Temporal Characteristics:
1 km for chlorophyll levels greater than 2.0 mg/m^3/daily, weekly

Key Science Applications:
ocean chlorophyll, ocean productivity

Key Geophysical Parameters:
chlorophyll fluorescence

Processing Level:
2

Product Type:
standard, at-launch

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